HYDRODYNAMIC SIMULATIONS OF FLUIDIZED GRANULAR MEDIA, **K. T. Duckert, J. Bougie*, Loyola University Chicago, Department of Physics, Chicago IL, 60626, kducker@luc.edu**

Systems composed of solid, macroscopic, interacting particles are known as granular materials. The purpose of this research is to apply fluid dynamic techniques to granular flow. Granular hydrodynamics treats granular materials as a continuum and analyzes the flow using fields such as density, velocity, and granular temperature. With grains, however, collisions between the particles are inelastic. Additional properties, such as friction and the relatively small number of grains in many systems, may modify the conventional fluid equations. We numerically solve a set of proposed granular hydrodynamic equations and compare to experimental data for a vertically oscillated bed with granular particles. Experimentally, when grains are shaken above a critical acceleration, patterns emerge with wavelengths dependent upon oscillation frequency. Our simulations also produce patterns with wavelengths consistent with experiment for a range of frequencies. However, the computational critical acceleration is lower than that found experimentally. This result is consistent with the presence of noise in the experimental system. We investigate the effects of adding noise to the numerical simulation as well as the application of these equations to other systems, such as an object impacting a stationary granular bed.